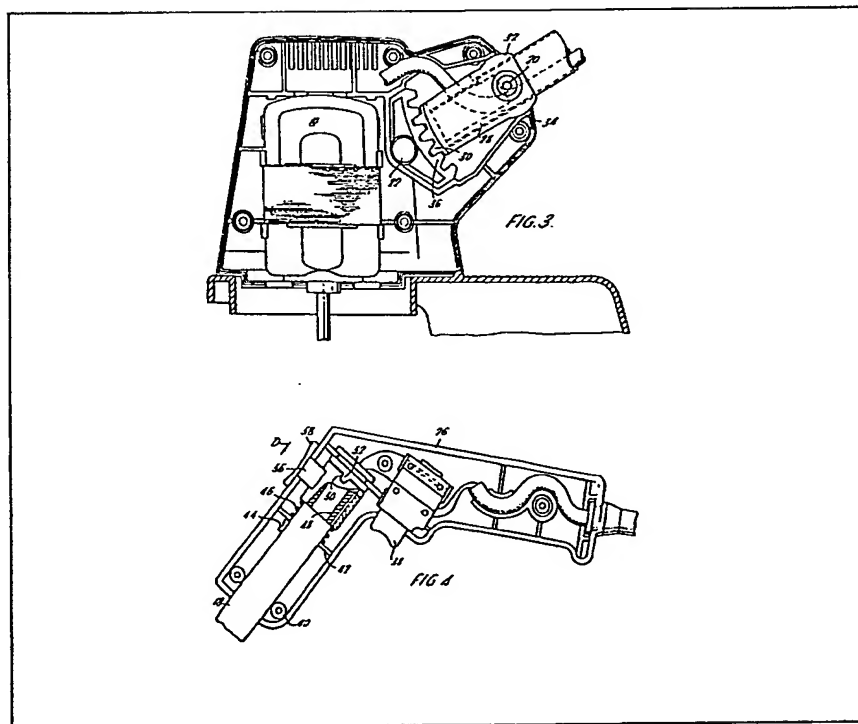


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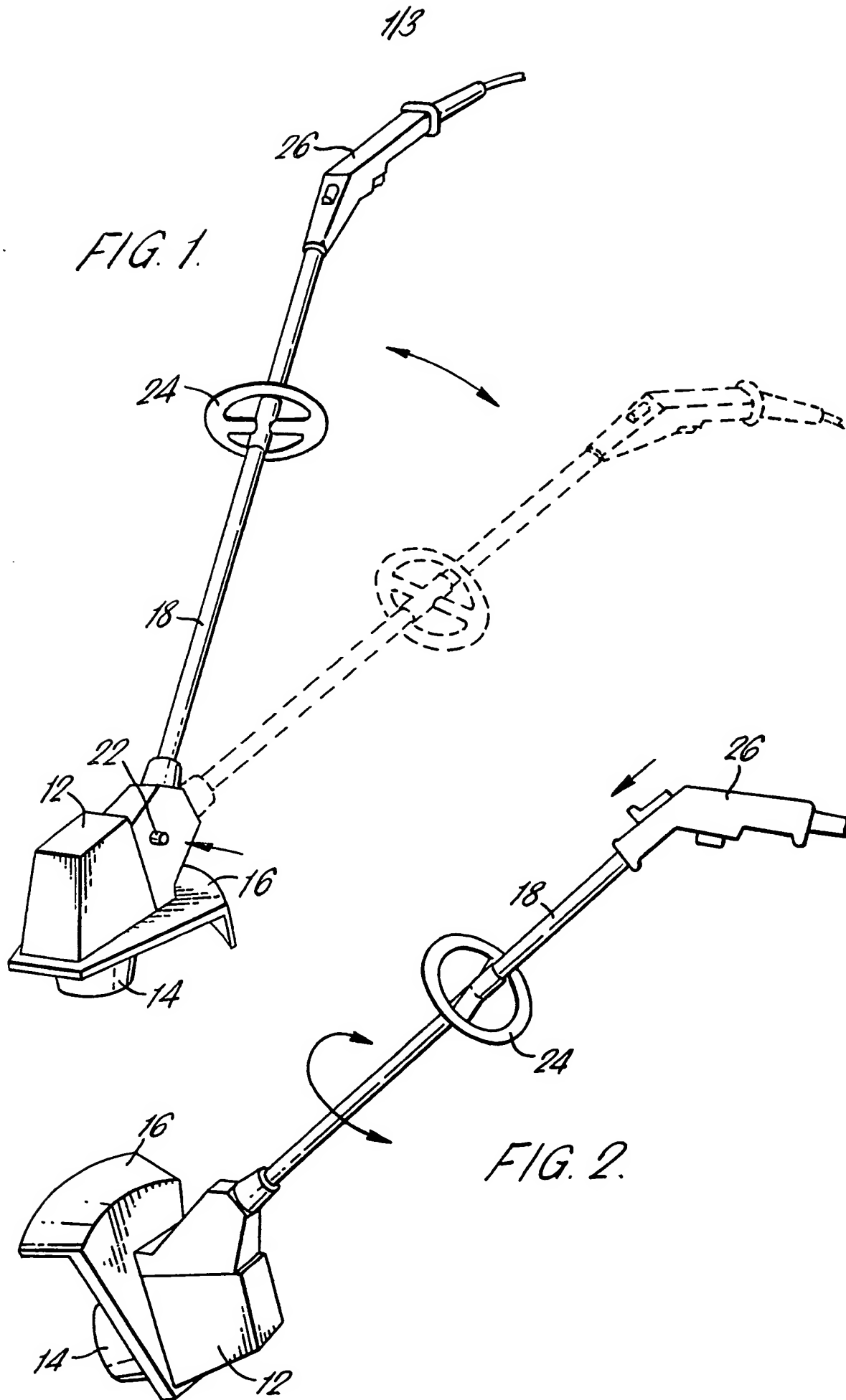
(54) Flail-type cutter with adjustable handle and handgrip

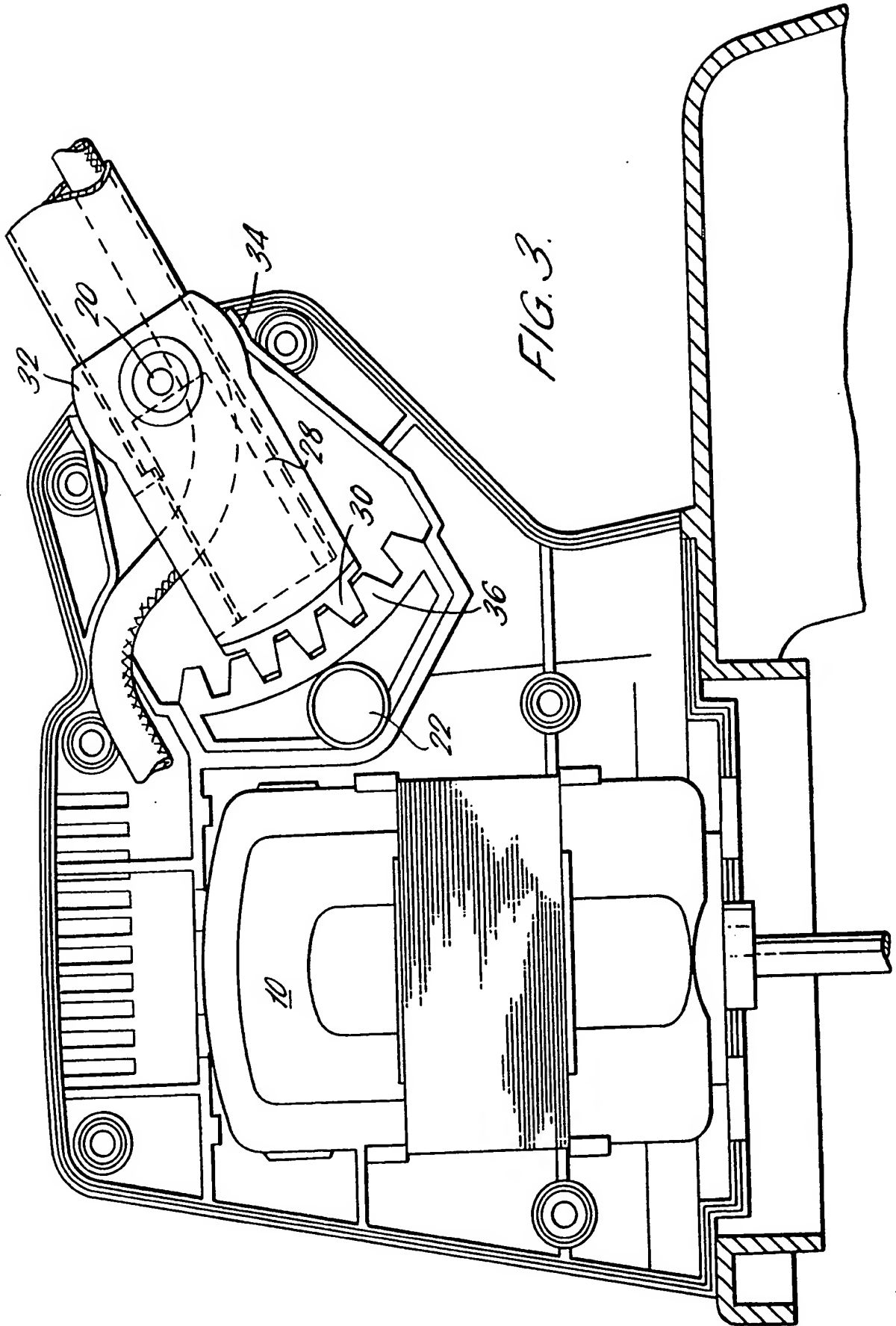
(57) The handle 18 is adjustable about a pivot 20 to any one of a number of selected positions defined by a pair of interengaged toothed segments 30, 36. The handgrip 26 is adjustable about the longitudinal axis of the handle and is locked in position by the engagement of a pair of diametrically opposed indentations 50 with a pair of diametrically opposed dogs 52. An auxiliary hand grip in the form of a wheel may be disposed on the handle.

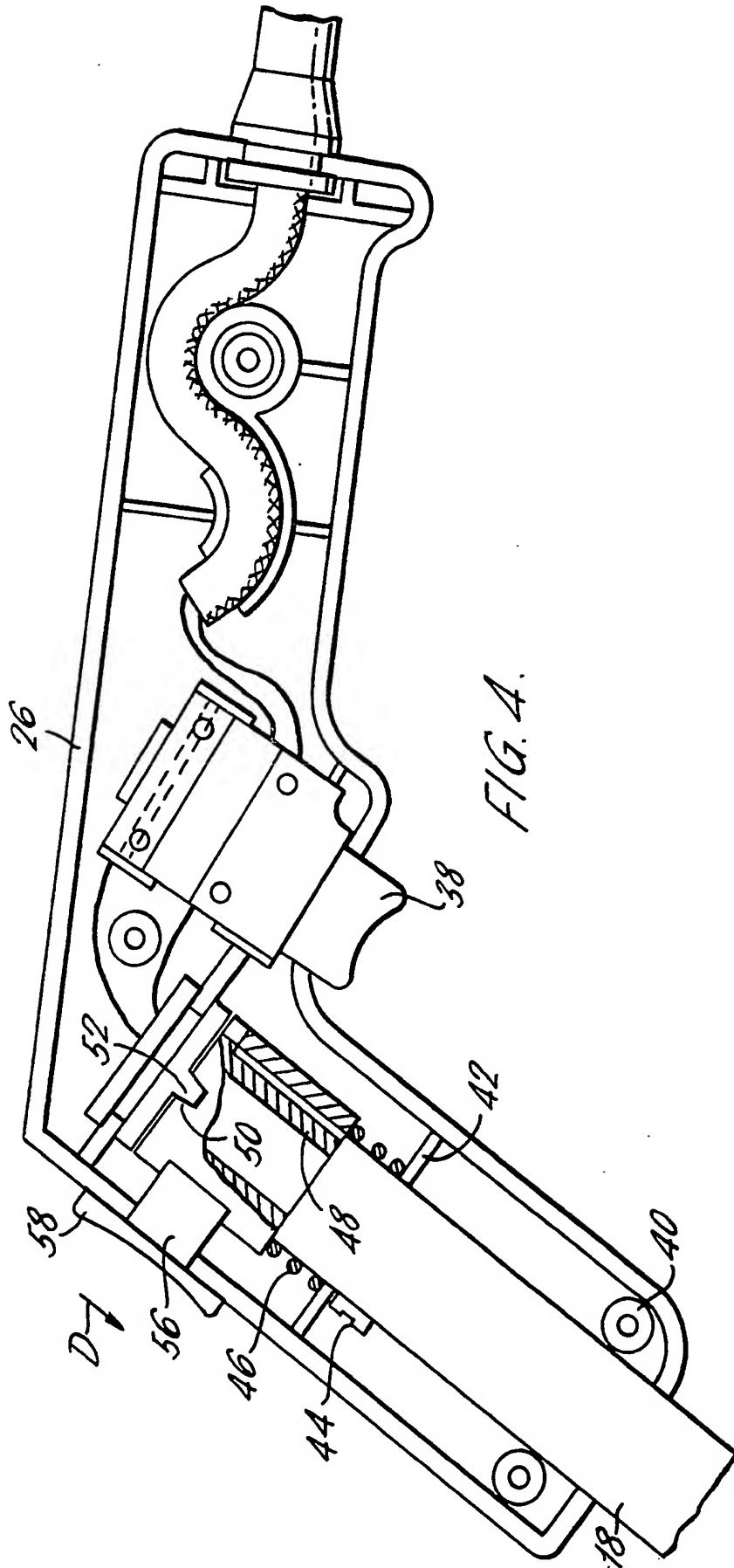


The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

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SPECIFICATION

Flail-type cutter for trimming lawn edges and the like

5 The invention relates to a cutter of the flail or thread type. Such flail-type cutters are known in the most widely varying designs, which are used for chopping or hacking down grass, weeds or other plants, especially those growing in the vicinity of obstructions, i.e. rocks, walls, enclosures or fences. Such flail-type cutters are admittedly not capable of accomplishing such a clean cut as is possible using grass shears with knife-edged blades, however, they do have the advantage that because of the flexibility of the cutting flail employed it is possible to work in the immediate vicinity of obstacles and even with careless handling no injuries are to be feared in the event of the cutting flail encountering sturdy footwear.

20 In the case of a flail-type cutter of this kind known from the United States Patent Specification No. 3 708 967, the drive motor is carried by the operator and this motor drives a flexible shaft which passes through the handle and which, in turn, drives the cutting head. In this case the grip is in fact flexible to some degree but it is endeavoured to keep the cutting plane always in the horizontal.

The United States Patent Specification No. 3 859 77 discloses a further development of a flail cutter-type. In this case the electric motor, which is surrounded by a motor housing, directly drives the cutting head. It is connected by a rigid handle to the grip part which carries a switch. The handle or shaft is bent over approximately at right angles to the motor housing and to the grip part and is rigidly mounted. A favourable guidance of the cutting head with horizontal cutting plane is achieved thereby. However, a prerequisite for a satisfactory cutting operation is a completely free space without the presence of either shrubs or fences, walls or other obstacles, such as border enclosures or the like. In practice, however, the grass or plants to be cut do not prove to be so readily accessible in most cases and, consequently, difficulties arise with the known flail-type cutter at obstacles and under trees or bushes.

Accordingly, the invention provides flail-type cutter with a cutting head driven by a motor provided in a motor housing, which head allows a cutting flail to swing out radially relative to the axis of rotation in a predetermined cutting arc, the motor housing being connected via a handle to a grip having a motor switch, in which, between the motor housing and the handle, a tilting joint is provided which can be locked in various tilt positions, the pivot axis of said joint extending perpendicular to the handle axis and parallel to the cutting plane.

The tilting movement in this case may advantageously be effected at an angle of 90° from the vertical into a horizontal position. In this way it is possible to tilt the handle or shaft down so low that it lies at the same height as the tool or cutting head, so that it is possible to cut comfortably under any bush or shrub so as to remove grass or other plants.

Preferably, a swivel joint is provided between the handle and grip, which joint can be fixed in various angular positions and whose swivel axis coincides with the handle axis. This swivel movement enables the cutting plane of the flail-type cutter to be adjusted, that is from a horizontal position into a position in which the cutting plane lies vertically. In this way overhanging grass can be more readily removed from edges. In the known appliances this was only possible if the appliance was swivelled together with the grip. However, this has the disadvantage that the grip also undergoes this swivelling movement and extremely uncomfortable manipulation results.

Moreover, the convenience of operation may also be improved by providing an auxiliary grip designed as a handwheel in the middle of the handle, since this grip can be grasped in any position so that it can be utilised both for horizontal application and for vertical application without swivelling. Accordingly, the appliance assumes a well-balanced position and it is substantially easier to work with such an appliance than with conventional appliances.

A preferred embodiment of the invention will be described below by way of example, with reference to the accompanying drawings, in which:-

Figure 1 shows a diagrammatic view in perspective of the flail-type cutter according to the invention with tilting joint;

Figure 2 shows a view in perspective of the flail-type cutter illustrated in *Figure 1* with swivel joint between the handle and the grip;

Figure 3 shows on an enlarged scale a sectional view of the motor housing with tilting joint between the motor housing and the handle, and

Figure 4 shows on an enlarged scale a sectional view of the grip part with swivel joint.

The flail-type cutter has a motor housing 12 enclosing the electric motor 10, from which housing there projects downward a cutting head 14 which is driven by the motor shaft. A thread or filament (not shown) protrudes radially from the cutting head 14 and performs the cutting operation. A protective cover 16 is positioned between the cutting head and the motor housing, the thread rotating inside said cover. A handle 18 is fitted to the motor housing 12, which handle can be tilted relative to the motor housing about a pivot 20 (*Figure 3*) and can be pivoted between the position indicated in solid line in *Figure 1* and the position indicated in broken line in *Figure 1*. The reference numeral 22 designates a release button. In its middle portion the handle carries an intermediate grip 24 in the form of a wheel. The top end of the handle 18 is connected to the grip portion 26 via a swivel joint illustrated in *Figure 4*. *Figure 2* shows the flail-type cutter illustrated in *Figure 1* turned through 180°, so that the flail rotates in a substantially vertical plane, whereas according to *Figure 1* the flail describes a horizontal cutting plane.

Further details of the tilting joint are apparent from *Figure 3*. The handle is mounted in the housing about the pivot 20. In this vicinity the handle carries a sleeve 28 which at its front end is provided with a locking segment 30. A spherical portion 32 of the

sleeve 28 is contacted by a plastic ball cup 34 of the housing, so that a tight seal is achieved. Opposite the end of the handle a toothed segment 36 is mounted in the housing so as to be displaceable transversely of the handle axis but incapable of independent rotation. By pressing the button 22 protruding from the housing it is possible to shift the locking segment 36 transversely and thus disengage it from the locking tooth 30. The handle can be tilted as desired after this disengagement and engagement can be effected in the desired inclined position, so that a positive or interlocking connection in the desired angular setting is obtained. In practice, the flail-type cutter is often used to cut grass under bushes, hedges and fences and in this case the upright handle is frequently in the way. The tilting facility of the handle makes easier handling possible in these circumstances.

As evident from Figure 4, the grip 26 has a pistol-like grip switch 38 for switching on the cutter supply. An intermediate wall or partition 42 in the form of ring extends in the middle portion between the handle 18 and the housing wall. This partition 42 is connected to the housing 26.

A helical compression spring 46 bears against the upper side. This helical compression spring 46 acts on a coupling sleeve 48 which slides loosely on the handle 18 and which at its end face has coupling recesses 50. These recesses 50 cooperate with coupling dogs 52 which are attached to the end of the handle. The rear end of the handle is rotatably supported in the grip casing *via* another partition 54. Axial location between the grip casing 26 and the handle 18 is effected by the partition 54 being securely engaged with a peripheral groove in the handle end, which groove can also be formed by two discs fitted at a distance apart. The coupling sleeve 48 is guided axially displaceably casing 26 and can slide in the direction of the arrow D, i.e. in the longitudinal direction of the handle. The displacement is effected by a control knob 58 mounted on the web 56.

To convert the flail-type cutter from the position in Figure 1 (in solid line) into the position in Figure 2, i.e. so as to be able to cut a lawn edge in the upright setting, it is necessary to turn the flail-type cutter of the motor housing through 180° (under the supposition that the handle is set at 45°). For this purpose the knob 58 is pushed forwards and in this way the coupling sleeve 48 is withdrawn from the coupling teeth 52, so that the appliance can be rotated through 180° until a stop member is encountered. When the end position is reached the control knob 58 is re-engaged with the coupling sleeve 48 under the action of the spring 46. According to the illustrated embodiment, two diametrically opposed coupling dogs 52 and indentations 50, respectively, are provided so that locking engagement is possible in two positions which are each rotated through 180° in relation to one another. In this way it is possible to adjust for horizontal and vertical cutting. Of course, there is also the possibility of providing several locking positions so that intermediate settings can be engaged. During the turning movement, and particularly during cutting in a vertical cutting plane,

the appliance can be comfortably grasped by way of the central grip 24 in any turning position.

CLAIMS

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1. Flail-type cutter with a cutting head driven by a motor provided in a motor housing, which head allows a cutting flail to swing out radially relative to the axis of rotation in a predetermined cutting arc the motor housing being connected *via* a handle to a grip having a motor switch, in which, between the motor housing and the handle a tilting joint is provided which can be locked in various tilt positions, the pivot axis of said joint extending perpendicular to the handle axis and parallel to the cutting plane.

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2. Flail-type cutter as claimed in claim 1, in which between the handle and grip a swivel joint is provided which can be fixed in various angular positions and whose swivel axis coincides with the handle axis.

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3. Flail-type cutter as claimed in claim 1 or claim 2, in which an auxiliary grip is provided in the middle portion of the handle.

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4. Flail-type cutter as claimed in claim 3 in which the auxiliary grip is designed as a wheel member.

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5. Flail-type cutter as claimed in any one of the preceding claims in which the handle is pivotably mounted in the motor housing for movement about a pivot axis and inside the housing interengaging locking means are provided respectively on the handle and on the housing.

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6. Flail-type cutter as claimed in claim 5, in which is secured a first toothed segment at the end of the handle which first toothed segment cooperates with a second toothed segment arranged in the housing, the centre of curvature of which segments lie on the pivot axis and in which the second toothed segment belonging to the housing, is mounted in the housing so as to be displaceable in the direction of the pivot axis.

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7. Flail-type cutter as claimed in claim 6, in which the second toothed segment, which can only be axially displaced in the housing and which is secured so as to be incapable of independent rotation, protrudes through the motor housing with an actuating button and under spring tension its locking position can be altered.

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8. Flail-type cutter as claimed in claims 5 to 7, in which the second toothed segment is mounted on a sleeve enclosing the end of the handle.

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9. Flail-type cutter as claimed in claim 8, in which the sleeve has ball-socket portions whose centre of curvature lies on the pivot axis and in which these ball-socket portions are tightly enclosed by ball-socket portions of the housing.

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10. Flail-type cutter as claimed in claim 2, in which the swivel joint is formed by partitions which are securely connected to the casing.

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11. Flail-type cutter as claimed in claim 10, in which a coupling sleeve is mounted non-rotatably but axially displaceably in the grip casing, which sleeve encloses the end of the handle and has coupling recesses which cooperate with coupling dogs on the end of the handle.

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12. Flail-type cutter as claimed in claim 11, in which the coupling sleeve protrudes *via* a web with a control knob outside the grip casing, the web being guided in a longitudinal slot in the grip casing and in

5 which between the annular disc and the sleeve a helical compression spring is extended which acts in the direction of coupling engagement.

13. Flail-type cutter as claimed in claims 10 to 12, in which two diametrically opposed coupling indentations and coupling dogs, respectively, are provided.

14. Flail-type cutter as claimed in claims 10 to 13, in which the handle is guided rotatably but not axially displaceably in the grip casing *via* a bearing.

15 15. Flail-type cutter substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

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